

## FORAGE SUITABILITY GROUP

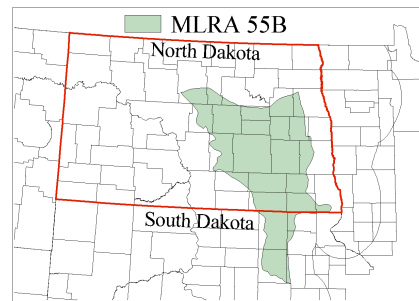
### Clayey Subsoil

**FSG No.:** G055BY210ND

**Major Land Resource Area:** 55B - Central Black Glaciated Plains

### Physiographic Features

Most of the soils in this group are located on nearly level to gently sloping positions of stream levees, terraces, and lake plains. A few occur in strongly sloping upland positions.



	<u>Minimum</u>	<u>Maximum</u>
<b>Elevation (feet):</b>	980	1970
<b>Slope (percent):</b>	0	15
<b>Flooding:</b>		
<b>Frequency:</b>	None	Occasional
<b>Duration:</b>	None	Brief
<b>Ponding:</b>		
<b>Depth (inches):</b>		
<b>Frequency:</b>	None	None
<b>Duration:</b>	None	None
<b>Runoff Class:</b>	Very low	Very high

### Climatic Features

This group occurs in a mid-continental climate characterized by wide seasonal temperature and precipitation fluctuations and extremes.

Annual precipitation varies widely from year to year in MLRA 55B. About 78% of the annual precipitation occurs during the months of April through September. On average there are about 28 days with greater than .1 inches of precipitation during the same time frame. Precipitation is lowest in the north west, and highest in the south in the MLRA. Precipitation is less than needed for optimum forage production and is the single largest factor limiting production from this group on non-irrigated lands.

Average annual snowfall ranges from 25 inches at Forman, ND to 37 inches at Columbia, SD. Snow cover at depths greater than 1 inch range from 32 days at Petersburg, ND to 98 days at Gackle, ND.

Average July temperatures are about 71 degrees F., and average January temperatures are about 7 degrees F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -39 at both Petersburg and Oakes in ND, and a high of 114 recorded at Mellette, SD. The MLRA lies in USDA Plant Hardiness Zones 3b and 4a.

At Aberdeen, SD the average annual wind speeds are about 11 MPH. The highest wind speeds occur during March through May, but average monthly wind speeds do not vary significantly throughout the year. It is cloudy about 163 days a year. Average morning relative humidity in June is about 85% and average afternoon humidity is 60%.

The climate data listed in the tables below represent high and low ranges and averages for the climate stations and dates listed. For additional climate data access the National Water and Climate Center at <http://www.wcc.nrcs.usda.gov>

<b>Freeze-free period (28 deg)(days):</b> (9 years in 10 at least)	115	137
<b>Last Killing Freeze in Spring (28 deg):</b> (1 year in 10 later than)	May 28	May 14
<b>Last Frost in Spring (32 deg):</b> (1 year in 10 later than)	Jun 06	May 23
<b>First Frost in Fall (32 deg):</b> (1 year in 10 earlier than)	Aug 29	Sep 10
<b>First Killing Freeze in Fall (28 deg):</b> (1 year in 10 earlier than)	Sep 08	Sep 21

<b>Length of Growing Season (32 deg)(days):</b> (9 years in 10 at least)	92	116
<b>Growing Degree Days (40 deg):</b>	3389	4402
<b>Growing Degree Days (50 deg):</b>	1852	2558
<b>Annual Minimum Temperature:</b>	-35	-25
<b>Mean annual precipitation (inches):</b>	16	21

**Monthly precipitation (inches) and temperature (F):**

<b>2 years in 10:</b>	<b><u>Jan</u></b>	<b><u>Feb</u></b>	<b><u>Mar</u></b>	<b><u>Apr</u></b>	<b><u>May</u></b>	<b><u>Jun</u></b>	<b><u>Jul</u></b>	<b><u>Aug</u></b>	<b><u>Sep</u></b>	<b><u>Oct</u></b>	<b><u>Nov</u></b>	<b><u>Dec</u></b>
<b>Precip. Less Than</b>	0.24	0.13	0.30	0.63	1.08	1.72	1.30	0.94	0.76	0.23	0.18	0.24
<b>Precip. More Than</b>	0.60	0.79	2.10	3.58	4.09	5.07	3.66	4.02	3.07	1.92	1.14	0.74
<b>Monthly Average:</b>	0.50	0.43	1.02	1.89	2.41	3.39	2.65	2.27	1.94	1.18	0.57	0.46
<b>Temp. Min.</b>	-8.2	-2.7	11.6	28.1	39.9	50.0	54.0	51.2	40.8	30.3	15.0	-2.0
<b>Temp. Max.</b>	21.8	28.2	41.0	58.2	70.9	80.0	87.3	85.5	74.0	61.5	42.1	26.2
<b>Temp. Avg.</b>	7.4	13.6	26.9	42.8	55.7	65.4	71.0	68.7	57.6	45.8	28.3	12.9

<b><u>Climate Station</u></b>	<b><u>Location</u></b>	<b><u>From</u></b>	<b><u>To</u></b>
ND2482	Edgeley, ND	1961	1990
ND2605	Oaks, ND	1961	1987
ND2605	Ellendale, ND	1961	1987
ND2949	Fessenden, ND	1961	1990
ND3117	Forman, ND	1961	1990
ND3287	Fullerton, ND	1961	1990
ND3309	Gackle, ND	1961	1990
ND4343	Hurdsfield, ND	1961	1990
ND4413	Jamestown, ND	1961	1990
ND4937	La Moure, ND	1961	1990
ND5764	McVile, ND	1961	1990
ND7027	Petersburg, ND	1961	1990
ND8937	Valley City, ND	1961	1990
SD0020	Aberdeen, SD	1961	1990
SD1873	Columbia, SD	1961	1990
SD5456	Mellette, SD	1961	1990

**Soil Interpretations**

This group consists of mostly well and moderately well drained, medium to fine textured soils formed in glacial till or sediments. Permeability is very slow to moderately slow. Some of these soils have moderate salinity in the subsoils.

<b>Drainage Class:</b>	Moderately well drained	To	Well drained
<b>Permeability Class:</b> (0 - 40 inches)	Very slow	To	Moderately slow
<b>Frost Action Class:</b>	Low	To	High

	<b><u>Minimum</u></b>	<b><u>Maximum</u></b>
<b>Depth:</b>	72	
<b>Surface Fragments &gt;3" (% Cover):</b>	0	3
<b>Organic Matter (percent):</b> (surface layer)	2	8
<b>Electrical Conductivity (mmhos/cm):</b> (0 - 24 inches)	0	8
<b>Sodium Absorption Ratio:</b> (0 - 12 inches)	0	10

<b>Soil Reaction (1:1) Water (pH):</b> (0 - 12 inches)	5.6	8.4
<b>Available Water Capacity (inches):</b> (0 - 60 inches)	6	
<b>Calcium Carbonate Equivalent (percent):</b> (0 - 12 inches)	0	5

## **Adapted Species List**

The following forage species are considered adapted to grow on the soils in this group. Additional information concerning plant characteristics of a number of the listed species as well as individual cultivars of many of those species can be accessed on the web at <http://plants.usda.gov/>

### **Cool Season Grasses**

Altai wildrye	F
Crested wheatgrass	G
Dahurian wildrye	G
Green needlegrass	G
Intermediate wheatgrass	G
Meadow brome	G
Newhy hybrid wheatgrass	G
Pubescent wheatgrass	G
Russian wildrye	G
Slender wheatgrass	G
Smooth brome	G
Tall wheatgrass	G
Western wheatgrass	G

### **Warm Season Grasses**

Big bluestem	G
Blue grama	G
Indiangrass	F
Little bluestem	F
Sideoats grama	F
Switchgrass	G

### **Legumes**

Alfalfa	G
American vetch	F
Birdsfoot trefoil	F
Canada milkvetch	F
Cicer milkvetch	F
Hairy vetch	F
Red clover	G
Sweetclover	G
White prairieclover	F
White clover	G

G - Good adaptation for forage production on this group of soils in this MLRA  
F - Fair adaptation but will not produce at its highest potential

## **Production Estimates**

Production estimates listed here should only be used for making general management recommendations. On site production information should always be used for making detailed planning and management recommendations.

The high forage production estimates listed below are based on dense, vigorous stands of climatically adapted, superior performing cultivars. They are properly fertilized for high yields, and pest infestations are kept below economic thresholds. Mechanical harvests are managed to maintain stand life by cutting at appropriate stages of maturity and harvest intervals. If grazed, optimum beginning and ending grazing heights are adhered to. Adequate time is allowed for plant recovery before entering winter dormancy under both uses.

The production estimates listed below represent total annual above ground plant production on an air-dry-matter basis. Estimates of hay and grazing yields can be calculated from these numbers by multiplying them by a harvest efficiency. A 70% harvest efficiency is commonly used when converting to hay yields. Pasture harvest efficiency is highly dependent on the grazing management system applied, ranging from 25% to 50%.

Forage Crop	Management Intensity	
	<u>High</u>	<u>Low</u>
	(lbs/ac)	(lbs/ac)
Alfalfa	7100	3400
Alfalfa/Intermediate wheatgrass	6600	3200
Alfalfa/Smooth brome	6600	3200
Big bluestem	6300	2600
Crested wheatgrass	5000	2500
Green needlegrass	3400	1600
Intermediate wheatgrass	5700	2300
Smooth brome	5700	2300
Switchgrass	6900	2900
Western wheatgrass	4000	1900

### Forage Growth Curves

Growth Curve Number: ND001

Growth Curve Name: Alfalfa

Growth Curve Description: Alfalfa

<u>Percent Production by Month</u>											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	5	25	30	20	15	5	0	0	0

Growth Curve Number: ND0002

Growth Curve Name: Cool season grass

Growth Curve Description: Cool season grass

<u>Percent Production by Month</u>											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	5	40	35	10	5	5	0	0	0

Growth Curve Number: ND0003

Growth Curve Name: Warm season grass

Growth Curve Description: Warm season grass

<u>Percent Production by Month</u>											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	0	10	40	35	15	0	0	0	0

### Soil Limitations

The primary limiting factors to these soils are their tight, slowly permeable nature, and moderate salinity of the subsoils of some soils. The less than ideal rooting zone and slow permeability reduce species choices and production potential.

Water holding capacity ranges from moderate to high. Forage production on soils of moderate water holding capacity will be noticeably affected during dry growing seasons. Moderately well drained soils will be more prone to compaction and plant damage if grazed during wet periods. On steeper slopes, water erosion is a potential problem during establishment when renovating stands and in thin established stands. Livestock trail erosion is a potential problem in established stands.

### **Management Interpretations**

The impact on yields due to the tight, slowly permeable nature of these soils, and moderate salinity in some of their subsoils can be reduced by selecting species adapted to those soil conditions when establishing new stands or renovating stands. To reduce compaction exclude livestock and machinery during extended wet periods. Including sod forming grass species in stands, especially on steeper slopes will reduce the potential for sheet and rill erosion. Incorporate erosion control practices during the establishment period. Properly locating facilitating practices such as fences, lanes, and water developments can help control livestock movement, reduce trailing perpendicular to steeper slopes, and evenly distribute grazing pressure.

Pasture and hayland can include considerations for wildlife. Delaying grazing on portions of the pasture or rotating pastures will allow nest initiation of grassland nesting birds or species of concern. Nest initiation of most grassland nesting birds occurs from April 15 to June 1. Delaying haying until after July 15 allows for most species to fledge their young. Consider planting species with later maturity to allow for harvesting after nests have fledged. Avoid mowing around the field. Mow back and forth or from the inside to the outside of the field. Consider using flushing bars on swathers and mowers.

### **FSG Documentation**

#### **Similar FSG's:**

##### **FSG ID**

G055BY800ND

##### **FSG Narrative**

Claypan soils have elevated salinity, sodicity, and/or alkalinity and are less productive.

#### **Inventory Data References:**

Agriculture Handbook 296-Land Resource Regions and Major Land Resource Areas, Natural Resources Conservation Service (NRCS) National Water and Climate Center, USDA Plant Hardiness Zone maps, National Soil Survey Information System (NASIS) for soil surveys in North Dakota and South Dakota counties in MLRA 55B, North Dakota and South Dakota NRCS Field Office Technical Guide, NRCS National Range and Pasture Handbook, various Agricultural Research Service, Cooperative Extension Service, and NRCS research trials for plant adaptation and production.

#### **State Correlation:**

This site has been correlated with the following states:

ND

SD

#### **Forage Suitability Group Approval:**

Original Author: Tim Nordquist

Original Date: 12/1/00

Approval by: Jeff Printz

Approval Date: